Design and Analysis of Algorithms (CSC 311) – Winter 2022–2023

Quiz 1: Dec. 27, 2022.
Duration: 30 minutes.
Please, don't use pencils.

Student Name & ID:..... Section:.....

This quiz has 3 questions, for a total of 15 points.

Question 1 ..... *6 points*

Indicate whether the following assertions are true or false.

1. $n^2(n+1)/2 \in o(n^4)$:.....
2. $n^2(n+1)/2 \in o(n^3)$:.....
3. $n^2(n+1)/2 \in \Theta(n^3)$:.....
4. $n^2(n+1)/2 \in \Omega(n^2)$:.....
5. $n^2(n+1)/2 \in \omega(n^3)$:.....
6. $n^2(n+1)/2 \in O(n^2)$:.....

Question 2 ..... *5 points*

Using the definition of $Big-Omega$, show that: $n^4+n^3+n^2+1 \in \Omega(n^4)$, where $n \in \mathbf{N}$.

Question 3 ..... *4 points*

Order the following functions according to their order of growth from the lowest to the highest.

$(n+10)!, 5n^4 \log(n)^{10}, 3^{2n}, 5^n, 0.001n^5 + n^2 + 1, \log n, \sqrt{n}$